What is claimed is:

1. A laser system, comprising:

a diode laser with an end facet and a front facet that surround a gain medium;

a first optical fiber having a first end optically coupled to the front facet; and

first and second wavelength-selective reflective elements formed in the first optical fiber and having at least partially overlapping respective first and second reflectivity bandwidths, the first and second wavelength-selective reflective elements being spaced apart from each other and from the front facet of the diode laser such that the laser system exhibits stable operation in the coherence collapse lasing regime.

2. The system of claim 1, wherein the first wavelength-selective reflective element is closest to the front facet, and wherein distance from the front facet to the first wavelength-selective reflective element is less than that possible for a single wavelength-selective reflective element used to maintain stable operation of the laser system in the coherence collapse regime.

3. The system of claim 1, wherein the diode laser has a coherence length, wherein first wavelength-selective reflective element is closest to the front facet, and the distance from the front facet to the first wavelength-selective reflective element is within the coherence length.

4. The system of claim 3, wherein the distance from the front facet to the second wavelength-selective reflective element is within the coherence length.

5. The system of claim 1, wherein at least one of the wavelength-selective reflective elements is a fiber Bragg grating.

6. The system of claim 5, wherein the first optical fiber has a core region, and wherein the at least one fiber Bragg grating is formed in the core region.

7. The system of claim 5, wherein the first optical fiber has a cladding region surrounding a core region, and wherein the at least one fiber Bragg grating is formed in the cladding region.

8. The system of claim 1, wherein the diode laser operates in a single longitudinal mode when free-running.

9. The system of claim 8, wherein the diode laser is a quantum-well-type laser lasing at or near 980 nanometers.

10. The system of claim 1, wherein the first and second wavelength-selective reflective elements are matched.

11. The system of claim 1, wherein the first and second reflectivity bandwidths are between about 0.1 nm and 1 nm.

12. The system of claim 1, further including:

a drive current power supply electrically connected to the laser for pumping the gain medium; and

a monitor optically coupled to the rear facet of the diode laser and electrically connected to the drive current power supply to provide an electrical signal to the drive current supply representative of output from the laser.

13. The system of claim 1, wherein the first optical fiber is single mode.

14. The system of claim 1, wherein the first optical fiber is not polarization maintaining.

15. The system of claim 1, further including a second optical fiber optically coupled to a second end of the first optical fiber, the second optical fiber having an active element that is energized by light emitted from the second end of the first optical fiber.

16. The system of claim 15, wherein the active element is an erbium-doped fiber amplifier.

17. The system of claim 15, wherein the active element is a fiber laser.

18. The system of claim 15, further including a third optical fiber coupled to the second optical fiber, wherein the third optical fiber provides an optical signal to be processed by the active element.

19. The system of claim 18, wherein the optical signal includes a plurality of channels corresponding to different wavelengths of light.

20. The system according to claim 18, wherein the active element is an erbium-doped fiber amplifier that amplifies the optical signal.

21. A laser system, comprising:

a laser with front and rear ends surrounding a gain medium;

a first wavelength-selective reflective element with a first reflectivity bandwidth optically coupled to the laser; and

a second wavelength-selective reflective element with a second reflectivity bandwidth that at least partially overlaps the first reflectivity bandwidth, the second wavelength-selective reflective element optically coupled to the laser through the first wavelength-selective reflective element such that the laser exhibits stable operation in a coherence collapse regime.

22. The laser system of claim 21, wherein the laser is a diode laser and the front end includes a front facet and the rear end includes a rear facet.

23. The laser of claim 22, wherein the front and rear facets form a first Fabry-Perot (FP) cavity, the front facet and first wavelength-selective reflective element form a second FP cavity, and the first and second wavelength-selective reflective elements form a third FP cavity.

24. The laser system of claim 21, further including an optical system arranged downstream of the laser.

25. The laser system of claim 24, wherein the first wavelength-selective reflective element is encompassed by the optical system.

26. The laser system of claim 24, wherein the second wavelength-selective reflective element is encompassed by the optical system.

27. The laser system of claim 24, wherein the first and second wavelength-selective elements are encompassed by the optical system.

28. The laser system of claim 24, wherein the optical system is arranged between the first and second wavelength-selective reflective elements.

29. The system of claim 24, wherein the optical system includes a first optical fiber.

30. The system of claim 29, wherein the first and second wavelength-selective reflective elements are formed in the first optical fiber.

31. The system of claim 30, wherein at least one of the first and second wavelength-selective reflective elements includes a fiber Bragg grating.

32. The system of claim 21, wherein at least one of the first and second wavelength-selective reflective elements includes a thin-film reflective filter.

33. The system of claim 21, wherein the first wavelength-selective reflective element is spaced apart from the laser front end by a distance less than that required for a single wavelength-selective reflective element to maintain stable operation of the laser system in the coherence collapse regime.

34. The system of claim 21, wherein the first wavelength-selective reflective element is within a coherence length of the laser.

35. The system of claim 21, wherein the second wavelength-selective reflective element is within a coherence length of the diode laser.

36. The system of claim 21, further including:

a power supply connected to the laser for pumping the gain medium; and

a monitor optically coupled to the rear end of the laser and electrically connected to the power supply to provide an electrical signal representative of the laser output to the power supply.

37. The system of claim 36, wherein the laser includes a diode laser, the rear end includes a rear facet, the power supply includes a drive current power supply, and the monitor includes a rear facet monitor (RFM).

38. The system of claim 29, wherein a first end of the optical fiber is coupled to the laser, the system further including a second optical fiber optically coupled to a second end of the first optical fiber, the second optical fiber having an active element that is energized by light emitted from the second end of the first optical fiber.

39. The system of claim 38, wherein the active element is an erbium-doped fiber amplifier.

40. The system of claim 38, wherein the active element is a fiber laser.

41. The system of claim 38, further including a third optical fiber coupled to the second optical fiber, wherein the third optical fiber provides an optical signal to be processed by the active element.

42. The system of claim 38, wherein the optical signal includes a plurality of channels corresponding to different wavelengths of light.

43. A method of forming a laser system having a stable output, comprising:

providing a laser having an output end;

providing adjacent the output end first and second spaced apart wavelength-selective reflective elements having at least partially overlapping reflectivity bandwidths;

optically coupling the first and second wavelength-selective reflective elements to the output end to provide substantially incoherent optical feedback to the laser.

44. The method of claim 43, wherein the laser has a coherence length, and including locating the first wavelength-selective reflective element a distance from the output end that is equal to or less than the coherence length.

45. The method of claim 44, further including locating the first and second wavelength-selective reflective elements within the coherence length.

46. The method of claim 43, including forming at least one of the first and second wavelength-selective reflective elements from a thin-film reflective filter.

47. The method of claim 43, including forming the first and second wavelength-selective reflective elements in a first optical fiber.

48. The method of claim 47, including spacing apart the first and second wavelength-selective reflective elements relative to the front end of the laser such that the effect of polarization rotation due to birefringence in the first optical fiber is reduced as compared to that using a single wavelength-selective reflective element.

49. The method of claim 47, wherein at least one of the first and second wavelength-selective reflective elements are fiber Bragg gratings.

50. The method of claim 43, wherein the laser includes a diode laser.

51. The method of claim 50, further including providing a drive current from a drive current supply to the diode laser to pump a gain medium within the diode laser.

52. The method of claim 51, further including monitoring the output of the diode laser from a rear facet opposite the front facet and providing an electrical signal representative of laser output to the drive current supply.

53. The method of claim 47, further including coupling a first end of the first optical fiber to the output end of the laser and energizing an active element with light emanating from a second end of the first optical fiber.

54. The method of claim 53, wherein energizing the active element includes optically pumping an erbium-doped fiber amplifier.

55. The method of claim 53, further including processing an optical signal with the active element.

56. The method of claim 55, wherein the processing of the optical signal includes amplifying the optical signal.

57. The method of claim 56, wherein amplifying the optical signal includes amplifying a plurality of channels at different wavelengths included in the optical signal.

58. A method of generating a stabilized laser output, comprising:

providing a laser having rear and front ends surrounding a gain medium;

optically coupling the laser to first and second spaced apart wavelength-selective reflective elements having at least partially overlapping reflectivity bandwidths to provide incoherent optical feedback to the laser such that the laser generates a stable laser light output in a coherence collapse regime.

59. The method of claim 58, including forming three distinct Fabry-Perot (FP) lasing cavities with the laser and first and second wavelength-selective reflective elements.

60. The method of claim 58, further including forming the first and second spaced apart wavelength-selective reflective elements within an optical system.

61. The method of claim 60, wherein the optical system includes a first optical fiber having an input end into which light from the laser is coupled, and an output end from which the stable laser light output emerges.

62. The method of claim 61, further including energizing an active element with light emanating from the output end of the first optical fiber.

63. The method of claim 62, wherein energizing the active element includes optically pumping an erbium-doped fiber amplifier.

64. The method of claim 62, further including processing an optical signal with the active element.

65. The method of claim 64, wherein the processing of the optical signal includes amplifying the optical signal.

66. The method of claim 65, wherein amplifying the optical signal includes amplifying a plurality of channels at different wavelengths included in the optical signal.

67. The method of claim 58, further including energizing an active element with the stable laser light output.

68. The method of claim 67, wherein energizing the active element includes optically pumping an erbium-doped fiber amplifier.

69. The method of claim 67, further including processing an optical signal with the active element.

70. The method of claim 69, wherein the processing of the optical signal includes amplifying the optical signal.

71. The method of claim 70, wherein amplifying the optical signal includes amplifying a plurality of channels at different wavelengths included in the optical signal.

72. A laser system comprising:

a diode laser with an end facet and a front facet that surround a gain medium, the diode laser having a coherence length;

an optical fiber having a first end optically coupled to the front facet;

first and second fiber Bragg gratings formed in the first optical fiber and having at least partially overlapping respective first and second reflectivity bandwidths, the first and second fiber Bragg gratings being spaced apart from each other and from the front facet such that the laser system includes three Fabry-Perot cavities and exhibits stable operation in the coherence collapse lasing regime.

73. The laser system of claim 72, wherein at least one of the first and second fiber Bragg gratings is located a distance from the front facet that is equal to or less than the coherence length.

74. The laser system of claim 73, wherein the optical fiber is single mode.

75. The laser system of claim 74, wherein the diode laser operates in single longitudinal mode in the absence of optical feedback.

76. The laser system of claim 75, wherein the optical fiber has an end arranged adjacent the front facet, the optical fiber end being polished so as to form a lens integral with the optical fiber.

77. The laser system of claim 76, further including:

a drive current power supply electrically connected to the diode laser for pumping the gain medium; and

a monitor optically coupled to the rear facet of the diode laser and electrically connected to the drive current power supply to provide an electrical signal thereto.

78. The laser system according to claim 76, wherein the optical fiber is non-polarization maintaining.

79. A method of providing a stable output from a laser system, comprising:

providing a diode laser having an output end and a coherence length;

forming in an optical fiber first and second spaced apart fiber Bragg gratings having at least partially overlapping reflectivity bandwidths;

optically coupling the optical fiber to the output end to provide substantially incoherent feedback to the diode laser such that the diode laser operates in a coherence collapse regime.

80. The method of claim 79, including positioning at least one of the fiber Bragg gratings a distance from the output end that is equal to or less than the coherence length.

81. The method of claim 80, wherein the diode laser operates in a single longitudinal mode in the absence of optical feedback.

82. The method of claim 81, including polishing an end of the optical fiber and placing the polished end adjacent the output end.

83. The method of claim 82, including providing a drive current to the diode laser to pump the diode laser.

84. The method of claim 83, including monitoring the output of the diode laser from a rear facet opposite the front facet and providing and electrical signal representative of the output power to control the providing of the drive current.

85. The method of claim 84, wherein the laser diode includes a first Fabry-Perot (FP) cavity, and the first and second fiber Bragg gratings form second and third FP cavities.

86. The method of claim 85, wherein the first and second fiber Bragg gratings are matched.